THE EFFECTS OF THE PASSAGE OF TIME WITHIN THE LEARNED HELPLESSNESS PARADIGM AND DEPRESSION

A THESIS

PRESENTED TO

THE FACULTY OF THE GRADUATE SCHOOL

APPALACHIAN STATE UNIVERSITY

IN PARTIAL FULFILLMENT

OF THE REQUIREMENTS FOR THE DEGREE

MASTERS OF ARTS

by

ROBERT MARION McCANTS

DECEMBER, 1976

THE EFFECTS OF THE PASSAGE OF TIME WITHIN THE LEARNED HELPLESSNESS PARADIGN AND DEPRESSION

by

ROBERT MARION McCANTS

Approved by

B. G. Schneider
Chairman, Thesis Committee

George R. Wesley
Professor of Psychology

Frank R. Terrant Jr
Assistant Professor of Psychology

Joyce G. Crouch
Chairman, Department of Psychology

Richard H. Rupp
Dean of the Graduate School

ACKNOWLEDGEMENTS

I would first of all like to thank my wife, Laura, for her generous help and support in the writing and preparation of this thesis. I also appreciate Dr. Henry Schneider's patience and advice in making this thesis possible. I would also like to thank the South Carolina Department of Mental Health for giving me the opportunity to continue my education.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

Ninety-six subjects were administered the Beck Depression Inventory and on the basis of their scores, assigned to depressed or nondepressed groups. A block randomization procedure was used to assign subjects to time and treatment groups. There were 8 blocks. Each block was divided into a depressed and nondepressed section, with each section containing six randomly ordered treatment conditions. The six treatment conditions were created by two time conditions--Immediate and 24 hour--, each with three pretreatment conditions--Insoluble, Soluble, and Control conditions. Miller and Seligman (1975) have demonstrated that learned helplessness can be produced by exposure to four insoluble discrimination learning problems. One of the results of the present study replicated this finding. Further, it was found that although learned helplessness was produced, it disappeared by 24 hours. Also, in contrast to the learned helplessness model of depression, depressed-control subjects did not significantly differ from nondepressed-control subjects on either dependent measure. It was found that although depressed subjects subjects make significantly more errors on anagram solutions, they are not slower than nondepressed subjects in response latency.

Review of Literature

Learned helplessness has been the term used to describe the interference with adaptive responding produced by previous exposure to inescapable and uncontrollable trauma (Seligman, 1975 a, p. 86).

Overmier and Seligman (1967) and Seligman and Maier (1967), while doing experiments on fear conditioning, observed a difference between dogs who were exposed to escapable shock or no shock and those exposed to inescapable shock in the Pavlovian harness. Twenty-four hours later all dogs were tested in a two-way shuttle box where they could learn to escape-avoid shock. It was observed that with the onset of the first electric shock in the shuttle box, the no shock and escapable shock dogs would run frantically about until it accidentally crossed the shuttle box barrier and escaped the shock. On succeeding trials, these dogs learned to escape the shock more quickly and eventually learned to escape-avoid the shock altogether. Only 6% of these dogs failed to learn to escape and avoid this shock. In contrast, two-thirds of the dogs previously exposed to inescapable shock failed to learn to escape or avoid the shock in the shuttle box. These dogs reacted in the same manner as the naive dogs to the first shock, but unlike the naive

dogs, after approximately 30 seconds, they stopped running and sat passively until the painful 50 second shock terminated. On all succeeding trials, these dogs continued to passively accept the shocks and not escape. It was also observed that if one of these dogs did jump the barrier, thus terminating the the shock, it would immediately revert back to passively accepting the shock. These dogs did not seem to benefit from response relief contingencies as the naive dogs did (Seligman, 1975a, p. 85-86; 1975b, p. 11-25; Maier, Seligman, and Soloman, 1969, p. 299-342).

Seligman's theory:

In order to explain this phenomena, Overmier and Seligman (1967) and Seligman and Maier (1967) proposed and tested the hypothesis that the dogs given inescapable shocks had learned that shock termination was independent of their responses; That is, "The probability of an outcome is the same whether or not a given response occurs." (Seligman, 1975b, p. 16). Thus the dog has learned he has no control over the shocks and nothing he can do will terminate them. Seligman and Maier have shown the central concept here was not the shock per se, but it was the degree of control over the shocks which was the determinant of whether or not interference occured in later escape-avoidance training.

It was further hypothesized that learning that responding and outcomes were independent had two effects which could account for why the dog failed to later learn to escape-avoid shock in the shuttle box (Seligman and Maier, 1967; Overmier and Seligman, 1967; Maier, Seligman, and Soloman, 1969, 299-342). First, there was a motivational effect. When the dog was strapped into the Pavlovian harness and given inescapable shocks, he first made active voluntary responses. Because the shock was inescapable, he learned that his responses were independent of shock termination. The incentive for response initiation in the presence of shock was partly produced by the expectation that responding increased the probability of shock termination. When this expectation was absent, the incentive for voluntary response initiation was low. The shock in the shuttle box aroused the same expectations learned in the harness--that responding and shock termination were independent. Thus the incentive for any active response initiation in the presence of shock in the shuttle box was low. Seligman and Maier (1967) stated that it may also be possible to explain this effect if one looked at a broad view of extinction.

Any procedure which decreases the probability of a response by eliminating the incentive is

> an extinction procedure. If independence of shock termination and responding eliminates the incentive to respond (as assumed), then our harness procedure could be thought of an extinction procedure. Such an explanation seems only semantically different from the one we have advanced, since both entail that the probability of responding during shock has decreased because subjects learned that shock termination was independent of its responses (Seligman and Maier, 1967, p. 8).

In contrast to the inescapable group, interference was not produced in the escapable group because subjects learned that their responding produced shock termination. The incentive for continual responding was present and the subject escaped normally. The second effect of learning that responding and reinforcement were independent was a cognitive one. A dog exposed to inescapable shocks had difficulty later learning that responding produced relief even when he made a response that produced relief. If a subject acquired a cognitive set in which A's were irrelevant to B's, then it would be harder to learn that A's produced B's when they actually did (Seligman, 1975a, p. 95; Maier, Seligman, and Soloman, 1969, p. 327). There was a third effect

unrelated to shuttle box escape but was an effect of learning that events were uncontrollable. It was an emotional effect (Seligman, 1975a, p. 95; 1975b, p. 27-44). Uncontrollable shock produced more conditioned fear, ulcers, weight loss, defecation, and pain than controllable shock in a study by Weiss (1968). Further, Seligman believed that when an organism was faced with an inescapable trauma, the initial response to control the trauma was elicited by fear. Fear decreased when the trauma was brought under control by the organisms responses. But as long as the organism was unsure whether or not he controlled the trauma, the fear was still useful as a motivator to search for a response that worked. Once the organism was certain the trauma was uncontrollable though, fear decreased and depression ensued.

Generality of learned helplessness:

Seligman (1975a, p. 86-88; 1975b, p. 31-35) stated that if learned helplessness was to be taken seriously as an explanatory principle for real life depression, anxiety, and sudden death, as he proposed, it must be demonstrated in a wide variety of situations. Seligman and others have demonstrated the generality of helplessness and its interference with a wide range of adaptive responses. Overmier and Seligman (1967) and Seligman

Maier (1967) claimed that the interference was very general and did not solely depend on the use of any particular shock parameter. In their studies they have varied the frequency, intensity, density, and temporal pattern of shocks and have produced the interference effect. They further stated that the inescapable shocks did not neccessarily have to be preceeded by a CS, nor did it matter where the shocks were given. At the lowest level of generality, helplessness transfered from one apparatus to another as long as shock occured in both. This has been shown in the typical learned helplessness paradign cited above. Braud, Wepman, and Russo (1969) extended this finding by demonstrating in mice that interference caused by inescapable shock was transferable to a non-shock situation--escape from a water maze. Here, mice given inescapable shocks were slower to escape a water maze than mice given escapable shock. McCulloch and Bruner (1939) produced similiar results in rats. In another study, Brookshire, Littman, and Stewart (1961) demonstrated that helplessness caused by inescapable shock generalized to another aversive experience--frustration. Rats given inescapable shocks were slower to escape a frustrating situation than an escapable or no shock group. Further, exposure to inescapable shock reduced aggressiveness in rats

(Maier, Anderson, and Lieberman, 1972; Powell and Creer, 1969; Payne, Anderson, and Murcurio, 1970) and competitiveness for food in puppies (Seligman, 1975b, p. 33).

It has been demonstrated that inescapable US's other than shock could produce effects which were similiar to the failure to escape shock. Escape deficits have been produced by inescapable tumbling (Anderson and Paden, 1966), inescapable loud noise (Hiroto, 1974; Hiroto and Seligman, 1975; Thornton and Jacobs, 1971), and insoluble discrimination learning problems (Hiroto and Seligman, 1975). Suomi and Harlow (1972) reported creating helplessness in rhesus monkeys by confining them to a narrow vertical chamber with a minimum amount of stimulation for the first 45 days of life. See Maier, Seligman, and Soloman (1969, p. 333-335;) and Seligman (1975a, p. 87; 1975b, p. 27-31) for an extended discussion of generality of helplessness in animals.

Learned helplessness has been demonstrated in studies by Seligman and Maier (1967), Overmier and Seligman (1967), Seligman, Maier, and Geer (1968), Overmier (1968), Maier (1970), Seligman and Groves (1970), Carlson and Black (1957) and Leaf (1964), all who used dogs as subjects. Deficits in escape or avoidance of shock as a consequence of inescapable

shock has also been shown in cats (Seward and Humphrey, 1967; Masserman, 1943), fish (Padilla, Padilla, Ketterer, and Giacalone, 1970), mice (Braud, Wepman, and Russo, 1969) and rats (Mowrer, 1940; Dinsmoor and Cambell, 1956; Dinsmoor, 1958; Seligman, Rosellini, and Kozak, 1974; Seligman and Beagley, 1975). It has further been demonstrated in man.

Thornton and Jacobs (1971) were the first to ex- never mind periment with learned helplessness in man. Using a paradigm very similar to the helplessness studies of animals, college students were pretreated with inescapable, escapable, or no shock. As a test for helplessness, all subjects could learn to escape shock by pressing a sequence of buttons. Their results parallelled the findings in animals--after contact with inescapable shock, subjects failed to escape shock which they could have in fact escaped. These subjects also failed to benefit from successful response-relief contingencies. Hiroto (1974) pointed out several methological problems with their study, concluding that their study demonstrated the effects of prior avoidance learning on later escape avoidance rather than learned helplessness.

Hiroto (1974) was the first to adequately demonstrate learned helplessness in man. In his study, college students were used who had internal-external scores of at least one standard deviation above or below the mean. An "internal" was a person who believed he controlled his own reinforcers and an "external" believed reinforcers came as a result of luck or chance. Hiroto believed there was a central concept of control inherent in both learned helplessness and internal-external studies and investigated this relationship. Subjects were randomly assigned to one of three pretreatments--escapable, inescapable, or no aversive noise-- and to one of two instructional sets-- performance in the shuttle box was a matter of chance vs skill. After 30 pretreatment trials with aversive noise, subjects were taken to a finger shuttle box, where in 18 trials, all subjects could learn to escape aversive noise. Results showed that subjects in the inescapable group failed to escape the aversive noise on over 50% of the 18 trials, while the escapable group failed in 13% and control group failed on 11% of the trials. Further, the external locus of control variable, as well as the chance instructions, interacted with inescapability to produce greater deficits than internal locus of control and skill instructions. Taken separately, external subjects, regardless of their pretreatment and instructional sets, were significantly slower to escape or avoid than internal

subjects. Similiarly, the chance instruction groups were significantly more retarded on dependent measures than the skill instructional groups. Hiroto concluded that learned helplessness, externality, and chance instructions all had a common underlying process: the expectancy that reinforcement was independent of responding. Hiroto had further extended the generality of the learned helplessness phenomena by demonstrating that helplessness could occur in man by pretreatments with an aversive noise.

Hiroto and Seligman (1975) recently did a series of four experiments investigating the generality of learned helplessness in man. Specifically they were interested in the transfer of helplessness produced by instrumental or cognitive pretreatments to new escapable instrumental or soluble cognitive task. Hiroto and Seligman reported that in all experiments helplessness was produced. The following results were obtained: (a) Instrumental pretreatment-Instrumental test task experiment: Subjects pretreated with an inescapable aversive tone escaped significantly more poorly in the shuttle box than subjects given escapable or control pretreatments. (b) Instrumental pretreatment-Cognitive test task experiment: Subjects pretreated with an inescapable aversive tone were significantly worse at solving anagrams than the escapable or control pretreatment groups on two of the three dependent measures.

(c) Cognitive pretreatment- Instrumental test task: Subjects pretreated with insoluble discrimination problems did significantly worse on shuttle box escape than the soluble or control pretreatment groups. (d) Cognitive pretreatments- Cognitive test task: With four insoluble discrimination learning problems, subjects in the insoluble group did significantly worse on anagram solutions than the soluble or control pretreatment groups on two of the three measures. Hiroto and Seligman cited three main findings: (a) Helplessness could be produced in man parallel to helplessness in animals. (b) Helplessness could be produced by a cognitive task without aversive stimuli. (c) Cross-modal helplessness could be demonstrated.

Time Variable:

An important variable within the learned helplessness paradign is time and research has shown that helplessness follows a time course. By varying the length of time between inescapable pretreatments and escape or avoidance training, one can investigate the question of how long learned helplessness last. In the typical helplessness experiment using dogs, there was usually a 24 hour period between pretreatment and escape-avoidance training. Overmier and Seligman (1967) investigated

this time variable with dogs by adding a 48 hour, 72 hour, and 144 hour group to the 24 hour group. Their results showed that dogs given inescapable shock and tested 48, 72, or 144 hours later, escaped significantly faster in the shuttle box than the 24 hour group given inescapable shock. These three groups did not differ among themselves though. Further, there was no significant differences in escape latencies between these three groups and groups exposed to escapable shocks. So, dogs responded normally if 48 hours or more elapsed between inescapable shock pretreatment and escape training. Seligman and Maier (1967) found that interference could be prolonged indefinitely if the dog was given an additional experience with inescapable shock within 24 hours of the first session of inescapable shock. Overmier (1968) did a study very similiar to the Overmier and Seligman (1967) study but the dogs were given instrumental avoidance training instead of escape training. Overmier (1968) found that if 72 hours or more elapsed between inescapable shock pretreatment and avoidance training, the dogs responded normally. Further, Seligman and Groves (1970) reported that two or four sessions of inescapable shock over a one week period produced interference with escape responding one week later. Unlike dogs though, rats failed to escape 5 minutes, 1 hour, 4 hours, 24 hours, and 1 week after receiving inescapable shock. (Seligman, Rosellini, and Kozak, 1975). To date there have been no studies investigating time as a variable with humans.

Proactive Inhibition (PI) and Retroactive Inhibition (RI) have been investigated as explanations for this time course. (Maier, Seligman, and Soloman, 1969, p. 332). The PI explanation was explained as follows: The dog used in the typical helplessness experiment arrived with an unknown past history. These dogs probably had a history of experiences where many of their responses produced relief and also had experiences controlling or escaping natural aversive events. If the dog then received one session of inescapable shock and learned that responding and shock termination are independent, PI from his previous experiences might affect retention. Since PI increases with time, (Underwood, 1948 ; Maier and Gleutman, 1967) it was possible that 24 hours after inescapable shocks in the harness, the PI was not strong enough to change the expectation that responding and shock termination were independent. But after 48 hours it may be strong enough. When multiple sessions with inescapable shock were used, this reduced the PI to a degree that nontransient helplessness was produced. (Seligman and Groves, 1970). It has also been found that dogs reared from birth in cages were more vulnerable

to helplessness than dogs of unknown past history. This could possibly be explained by the fact that cage reared dogs had little opportunity or experiences to learn that responding produced relief. These animals should thus have little PI and be more susceptible to helplessness (Seligman and Groves, 1970). Seligman, Rosellini, and Kozak (1975) similiarily offered this as an explanation as to why their cage reared rats did not follow a time course. The RI explanation stated that after the dog received a session of inescapable shocks, he was returned to his cage and between this time and the time for escape-avoidance training, he would engage in some sort of activity. This activity may retroactively inhibit what was learned in the harness. Forty-eight hours may retroactively inhibit what was learned in the harness, while 24 hours may not.

Learned helplessness and depression:

Seligman (1973; 1975a; 1975b, p. 75-81) has tenatively claimed that learned helplessness may be used as a model for reactive depression. Seligman rationalized using a laboratory induced animal phenomena as a model for human pathology by arguing two points. First, he stated that a laboratory model, which was usually well defined, would improve and refine the present losely defined definition of depression. A laboratory model

placed neccessary conditions on an open-ended clinical label. Thus, the learned helplessness model dealt only with depressions that defined learned helplessness; that is, an individual who was passive, had a negative cognitive set, and believed that his responses had no effect on outcomes or rewards. "Depression in this model is a specific cognitive distortion of the perception of the ability of one's own response to change the enviroment, rather than a general pessimism" (Miller and Seligman, 1973). Secondly, Seligman stated that if helplessness and depression were similiar on certain criteria, then one could test the model by looking for similiarities predicted on other criteria. For example, if one could cure learned helplessness in the dog by forcing him to respond in a way that produced relief, then one could predict a similiar cure for depression in man.

Seligman (1973; 1975a, p. 80-107; 1975b, chapter 5) and Miller and Seligman (1973) stated that there were four main lines of evidence that suggested that depression and learned helplessness were similiar, thus providing evidence for the model: (a) Behavioral and physiological symptoms (b) Etiology (c) Cure (d) Prevention.

Behavioral and Physiological Symptoms:

The three main effects of learned helplessness--motivational, cognitive, and emotional--mentioned earlier in this paper are also characteristic of depression. In relation to learned helplessness, they will be only mentioned briefly here in order to prevent repetition.

Both learned helplessness and depression have the common symptom of passivity or reduced voluntary responding. Within depression, Miller (1975) stated that psychomotor retardation was generally considered to be a major symptom. Ferster (1963) stated,

> The bulk of the depressed person's activity is likely to be passive.... The most obvious characteristic...is a loss of certain activity.... The latency of a reply to a question may be longer than usual, and speaking, walking, or carrying out routine task will also occur at a slower pace. (p.857)

Seligman (1975b, p. 82-84) cited several researchers who have observed this slowness, retardation, and passivity in behavior, speech, and responding of the depressed person.

The formulation of a negative cognitive set--the belief that success and failure are independent of one's responses--is another behavioral symptom which learned helplessness and depression share. Within the helplessness paradign, once an organism had experience with uncontrollability, he had trouble learning that his responding had succeeded, even when they actually successful (Seligman, 1975b, p. 37). Depressed individuals also formed negative expectations about the effectiveness of their responding. They seemed to have difficulty believing that their responding works. Depressives often saw themselves as "Born Losers" and saw their responses as "doomed to failure". "His cognitive response to a problem or difficulty is likely to be an idea such as, 'I'm licked, I'll never be able to do this'" (Beck, 1967, p. 256-257). Friedman (1964) observed that even though a depressed individual performed a task correctly, he reiterated the original protest of "I can't do it" or "I don't know how."

Most of the studies in this area have looked at how depressives see and react to reinforcement contingencies. Miller and Seligman (1973; 1974; 1975) did several studies which tested the negative expectations of the learned helplessness model on depressed subjects. Results tended to show a similiar negative cognitive set could be found in both learned helplessness and depression. Miller and Seligman (1973) used 32 college

students who were divided into four groups, depending on scores on the Beck Depression Inventory: (a) depressed high external (b) depressed-low external (c) nondepressed high external (d) nondepressed-low external. All subjects were given two tasks to perform. One task involved guessing which of two slides would appear at a particular time. Success appeared to be a chance event. The second task involved moving a steel platform upward in a way so that a steel ball was kept from rolling off. Success here appeared to be a result of skill. After each trial, subjects stated whether they expected to be successful on the next trial. What was important was that the experimenter had control over the subjects successes on both tasks in order to make the reinforcements (success on a trial) the same for all subjects. The question this experiment answered was: How did success or failure on any given trial effect the subjects expectation of success on the next trial. According to the helplessness model of depression, a depressed individual saw his responding and reinforcements as more response independent than nondepressed individuals in situations where reinforcement was response dependent. Thus the model would predict that depressed subjects in a skill task should perceive reinforcement as more response independent than nondepressed subjects and thus depressed subjects should show less change in expectancy following reinforcement in a skill task than nondepressed subjects. On the chance task, the model predicts that nondepressed and depressed subjects should both see responses and rewards as independent. Thus both groups should not differ on response expectancy changes. Both predictions were confirmed. It has been shown in other studies (James, 1957; James and Rotter, 1958; Phares, 1957; Rotter, Liverant, and Crowne, 1961) that following reinforcement, subjects tended to change their expectancies for future success more often when they perceived the reinforcement as contingent on their own responses than when they viewed the reinforcement as independent of their responses. In light of this, Miller and Seligman suggested that the smaller expectancy changes in the skill task of the depressed subjects were due to their perceiving the reinforcement as more response independent than did the nondepressed subjects. It was also found that the more depressed an individual was, the lower his expectancy change scores in the skill task. Externality alone did not have a significant effect on expectancy change in either task. In conclusion Miller and Seligman stated the expectancy that reinforcement and responding were independent was a major behavioral manifestation in depression.

A similiar experiment was done by Miller and Seligman (1974, cited in Seligman, 1975b, chapter 3) but used normal subjects who had been subjected to inescapable noise to produce helplessness. They found that these subjects had produced a negative cognitive set when compared to subjects in the escapable or control groups. Similiar to the depressed subjects in Miller and Seligman (1973), helpless subjects showed little expectancy changes on a skill task, while escapable and control groups showed large changes. It was concluded that learned helplessness produced a cognitive set in which people believed that success and failure was independent of their own skilled actions, and therefore had difficulty learning that responding worked.

A third study by Miller and Seligman (1975) in this area showed a similiarity of impairment in depression and learned helplessness. Depressed and nondepressed college students were pretreated with escapable, inescapable or no aversive noise. This was followed by a test task involving a series of 20 anagrams. The following predictions were made: (a) Nondepressed subjects in the inescapable noise group would show deficits in response initiation to anagrams--require more trials to learn anagram patterns, fail to solve more anagrams, require more anagram solutions to solve the

problem--when compared to nondepressed subjects in the escapable or no noise group. (b) Depressed no noise subjects would exhibit deficits in response initiation and learning when compared to nondepressed no noise group. Both predictions were confirmed. In addition, on the pretreatment trials, depressed subjects required significantly more trials to learn how to escape the noise than nondepressed subjects. The depth of depression had a significantly positive correlation with the number of trials to escape the noise as well as with increasingly poorer performance on all anagram measures. Further, they reported that depressed-inescapable noise subjects did not differ significantly from depressed escapable and no noise subjects on any of the dependent measures, but depressed-escapable noise subjects performed significantly better on all dependent measures than the depressed no noise subjects. Besides showing helplessness in man and cross-modal helplessness, these results lent support to the helplessness model of depression.

Besides passivity and a negative cognitive set, there are several other behavioral characteristics which learned helplessness and depression share. One is a time course. As mentioned earlier, after one session of inescapable shock, helplessness tended to dissapate rather

quickly. It was generally thought that time also had an effect on reactive depressions. If a depression was left untreated, it would usually dissapate in time (Paskind, 1929).

Another similiarity was the lowering of aggression and competitiveness. Studies cited above show this is true in learned helplessness. Depressed individuals also were usually observed as being less aggressive than nondepressed individuals. Kurlander, Miller, and Seligman (1974, cited in Seligman, 1975b) have shown that both depressed and "helpless" subjects were less competitive, showed more withdrawal responses, and were more passive than nondepressed or nonhelpless individuals.

The last parallel in this area is the physiological symptoms that learned helplessness and depression have in common. It has been reported that rats given inescapable shocks showed more retarted weight gain (Weiss, 1968) and anorexia (Mowrer and Viek, 1948; Lindner, 1968) than rats given escapable shock. Similiarly, it was commonly observed that depressives eat less, lose weight, and lose sexual interest. Norepinephine has also been associated with both learned helplessness and depression. Weiss, Stone, and Harrell (1970) reported that norepinephrine is depleted in brains of rats who were given inescapable shock, while it was

elevated in rats who could control shock. The catecholamine theory of depression (Schildkraut, 1965) stated that norepinephrine was depleted in depressives.

Besides parallels, Seligman (1975a, p. 92) also saw limitations or differences between the behavioral manisfestations of learned helplessness and depression. He pointed out that the largest single difference was that people could talk and tell others what they were thinking and feeling but animals could not. Because humans could express feelings, many symptoms incorporated in the diagnosis of depression were based on subjective terms--for example, loneliness, hopelessness, apathy, worthlessness. In the helplessness model though, animals could not describe the way they were feeling. Also suicide and sobbing are behavioral symptoms of depression but not learned helplessness. Seligman stated further that helplessness was experimental and unselected while evidence on depression was clinical, anecdotal, and selected.

Etiology:

The cause and effects of learned helplessness was discussed earlier in this paper. To date, the causes of depression are not clear.Although theories of depression are developed mainly through observation, many theorists agree about some of the basic causes. Many of these

theorists (Bibring, 1953; Beck, 1967; Lichtenberg, 1957; Melges and Bowlby, 1969) agree that depression results from a cognitive distortion of the perception of one's own responses to influence his environment. Seligman also is in agreement with this and has been the first to experimentally test it. Seligman (1975a, p. 98) believes that when the individual learns or believes that he can no longer control the important aspects in his life that relieves suffering and brings satisfaction, he becomes depressed. In effect he learns that that his responding and reinforcements are independent. This then results in motivational, cognitive, and emotional effects. According to Seligman's explanation, an individual who is rejected by a loved one becomes depressed because he can no longer control this significant source of gratification. Seligman (1975a, p.99) notes several problems and differences in etiology in helplessness and depression.

Cure:

Only one treatment has been found as a cure for learned helplessness--forcing the organism to see the response-relief contingencies. Seligman, Maier, and Geer (1968) had to literally force dogs across the shuttle box barrier during CS and shock with long leashes in order to get the dogs to see that their responding did have an effect. There has been no systematic evidence supporting a cure for depression. There are several therapies that reportedly relieve depression and fit into the learned helplessness model of depression, but Seligman took note to caution that they should not be regarded as a test for the model. The model suggested that depressive therapies should focus on having the patient find out that responses and gratification were contingent--having the patient regain his belief that he could control events which were important to him. (Seligman, 1975a, p. 102).

Prevention:

Seligman and Maier (1967) have done work in which they have found that dogs could be "behaviorally immunized" against the effects of inescapable shocks, thus preventing the occurance of learned helplessness. Learned helplessness theory suggested that if an organism had initial experience with control over trauma, this should interfer with forming the expectation that responding and reinforcement were independent, just as not being able to control the trauma interfered with learning that responding produced relief (Seligman, 1975b, p. 57).

In summary, learned helplessness has been a term used to describe the interference with adaptive respond-

ing produced by inescapable trauma. Learning that responding and reinforcements were independent has three effects--motivational, cognitive, and emotional. Learned helplessness was found in many animal species, including man, and under a wide variety of conditions and apparatus. Seligman has further proposed that learned helplessness may be a model of depression. He cited four lines of evidence that suggested that depression and helplessness were similiar phenomena.

Statement of the Problem

Studies have shown learned helplessness to be a general phenomena produced in many species and across many tasks. The first learned helplessness studies dealt with animals but recently the literature has been expanding to studies on humans. It has been demonstrated that learned helplessness exists over short time periods in animals, but no studies have investigated this time variable in humans. The present study investigated the question of how long learned helplessness last in man by altering the time between pretreatments and test task. The present study used the time intervals of immediate and 24 hours.

It was predicted that: (a) The nondepressed subjects in the immediate-insoluble condition would perform significantly more poorly on the test task than

nondepressed subjects in the immediate-soluble or soluble subjects. (b) Depressed-immediate-control subjects will perform significantly more poorly on the test task than nondepressed-immediate-control subjects, thereby minicking the effects of uncontrollability. The present study also investigated the subject characteristics of depression and nondepression within these time intervals.

Method

Subjects. Ninety-six students from Appalachian State University were obtained by making appeals for volunteers in undergraduate classes. All subjects were told the experiment would involve taking a self-report inventory and participating in two short unrelated tasks--a discrimination learning task and an anagram task. All subjects were administered the Beck Depressive Inventory (Beck, 1967) and on the basis of their scores were assigned to a depressed or nondepressed group. Those subjects with Beck Depressive Inventory scores of 12 or greater were assigned to the depressed group and those with scores of 4 or less were assigned to the nondepressed group. This criterion was obtained by computing a mean of 8 and standard deviation of 5.11 from 172 subjects who took the Beck Depression Inventory and excluding those

subjects whose scores fell within .5 standard deviation of the mean. There were 48 subjects in each group. A block randomization procedure was used to assign subjects to groups. There were 8 blocks. Each block was divided into two sections--depressed and nondepressed-- with each section containing six treatment conditions. There was one subject per treatment condition in each section making a total of eight subjects per treatment condition. The depressed section of each block was created by randomly ordering one of each of the six treatment conditions with the restriction that the insoluble pretreatment came before the control pretreatment. This was done in order to yoke the control pretreatment subjects time to each discrimination learning problem with the insoluble subjects time. Starting with block one, depressed subjects were randomly assigned to one of the six treatment conditions within the depressed section. The same procedure was used to create the nondepressed sections and assigning nondepressed subjects. Table 1 presents the means and standard deviation of Beck scores for each of the 12 groups.

Apparatus. The Beck Depression Inventory (BDI) (Beck, 1967; See Appendix A) was used to assign subjects to depressed or nondepressed groups. The BDI

Table 1

Means and Standard Deviations for BDI Scores[a]

Group	Depressed		Nondepressed	
	Mean	SD	Mean	SD
Immediate	16.830	3.90	2.166	1.54
Insoluble	18.830	6.24	2.635	1.30
Soluble	17.250	2.32	1.875	1.55
Control	14.625	3.15	2.000	1.77
24 Hour	16.625	4.01	2.375	1.40
Insoluble	16.375	3.06	2.000	1.41
Soluble	17.250	4.68	1.750	1.38
Control	16.250	4.30	3.375	1.41

a: 8 subjects per cell

is a short 21 item questionairre with adequate validity and reliability. The standardized instructions of the BDI are for individual administration, but for the purpose of economy of time, a group administration with standardized instructions for all subjects was used. (See Appendix B). Standard scoring of the BDI was used (Beck, 1967).

Discrimination Learning Cards. The pretreatment task consisted of a series of 10 stimulus cards, on each of which were two four dimensional stimulus patterns. Appendix C presents a sample of these discrimination learning cards. These stimulus patterns were first used by Levine (1966, 1971) in discrimination learning studies. Each of the four dimensions had two associated values: (a) letter (C or L) (b) letter color (green or white) (c) letter size (large or small) (d) position (right or left). On each stimulus card one stimulus pattern consisted of a set of values from each of the four two-valued dimensions; the other pattern consisted of the complimentary values of the dimensions. From one trial to the next, the dimensional values shifted from one pattern to the next according to a set of rules adapted from Levine (1971): (a) On each pair of adjacent trials, values from two dimensions remained paired together, while values from the other two dimensions changed (from trial

1 to trial 2, color and position changed while size and letters did not) (b) No two dimensional values were paired to each other for more than three consecutive trials (e.g., C's were not large for more than three consecutive trials, etc.) (c) For any dimensional value, there was only one other value paired for the three consecutive trials. The stimulus patterns were drawn on 4x6 inch plain white index cards 1½ inches apart. The large letter was 1 inch in height, the smaller letter ½ inch in height.

Prior to the four pretreatment problems, one five-trial three-dimensional sample discrimination learning problem was presented for clarification of the task. (See Appendix C). The sample problem had the same dimensions as the experimental discrimination learning problems with the exclusion of the "position dimension". The sample problem also had different characteristics associated with the dimensions.

Anagrams. The test task consisted of 20 soluble anagrams taken from a list of 5-letter anagrams constructed by Tresselt and Mayzner (1966; see Appendix D). The 5 letters of each anagram were arranged in the sequence of 2-4-1-5-3 (the first letter of the solution word was the third letter of the anagram; the second letter of the solution word is the first letter of the anagram). The anagrams were placed individually on 4x6 inch plain white index cards and were composed of 1

inch letters spaced ½ inch apart. A second set of 5 letter soluble anagrams was also administered (Appendix D). This set consisted of 20 anagrams taken from Tresselt and Mayzner (1966). The 5 letters of each anagram were arranged in a sequence of 3-4-2-5-1. These anagrams were constructed identically to the first set.

The Wechler Adult Intellegence Scale, Vocabulary Subtest was given to all subjects on their return visit and also after the anagrams were administered on this day. The Vocabulary subtest consist of 40 words of ascending difficulty. The Vocabulary subtest correlates .87 with the Full Scale Score and .90 with the Verbal Score.

Procedure. All subjects were administered the BDI through group administration and on the basis of their scores were assigned to appropriate sections--depressed or nondepressed --within each block and to one of six treatment conditions. The six treatment conditions were created by two time conditions--Immediate and 24 hour--, each with three pretreatment conditions--Insoluble (IP), Soluble (SP), and Control (C). The two time conditions refered to the length of time between the pretreatment--discrimination learning problems--and the test task--soluble anagrams. Subjects in the 24 hour conditions received the test task exactly 24 hours after the pretreatment. Subjects in the Immediate conditions received the test task immediately after the pretreatment. The Immediate condition subjects were also asked to return 24 hours later. On their return they were given a second set of anagrams. The three pretreatment conditions refered to the type of discrimination learning problems the subject received. Subjects in the IP conditions received four insoluble discrimination problems with no consistent "correct" values. Subjects in the SP conditions received four identical but soluble problems. The C condition subjects inspected the stimuli of the same four problems but received no feedback or problem solving instructions.

Each subject was escorted into the experimental room, seated across from the experimenter, and reminded that the experiment consisted of two short unrelated tasks. The subject was then read a set of standardized instructions, given in Appendix E. Subjects in the IP and SP conditions were first presented one five-trial three-dimensional sample discrimination learning problem in order to clarify the task. The Control subjects were given the same sample problem but without clarifying instructions. After the sample problem, all subjects were asked whether they had any questions. For all subjects this was followed by another set of

standardized instructions, given in Appendix F, introducing the four pretreatment discrimination learning problems. Each problem consisted of 10 trials. For each trial the subject was presented one of the 10 stimulus cards. The same 10 cards were used for all problems. The IP condition involved a prearranged set of correct-incorrect feedback from the experimenter independent of subject choices. This made the subjects responses and reinforcement ("correct" feedback) independent; that is, no matter what the subject said, he could not "solve" the problem. The schedule of reinforcements was; I-C-I-C-C-I-I-C-C-I for the first problem; C-I-I-C-C-I-C-I-C-I for the second problem; I-C-I-C-I-C-C-I-C-I for the third problem; C-C-I-I-C-I-C-I-I-C for the fourth problem. At the end of each problem, the IP group was told, "Sorry, that's the wrong answer," when they stated a solution to the problem. Hiroto and Seligman (1975) have demonstrated that by using four insoluble discrimination learning problems, learned helplessness can be produced.

The subjects of the IP and SP conditions were allowed a maximum of 15 seconds to respond to each card. The C condition's card exposure times were yoked (matched) to the exposure times for subjects of the IP conditions within each block.

The time between pretreatment and the first set of anagrams was determined by the subjects time condition. The pretreatment and test task were conducted in the same room by the same experimenter. Each subject was read a standardized set of instructions, given in Appendix G, before the test task. All anagrams were randomly ordered for each subject. All Immediate time condition subjects were given the second set of anagrams during their second session 24 hours later. All anagrams were soluble for all subjects. A maximum of 100 seconds was allowed per anagram. The same set of instructions were used for the second set of anagrams as were the first.

Hiroto and Seligman (1975) suggested four dependent measures for use with anagrams: (1) Number of trials to criterion for anagram solution, defined as the subject solving three consecutive anagrams in less than 15 seconds. (2) Number of failures to solve, defined as the number of trials with latencies of 100 seconds. (3) The mean response latency (4) The number of consecutive, successful anagram solutions that occured prior to reaching the criterion for learning the pattern. Measures 2 and 3 were analyzed in the present experiment.

Results

Total Errors. The first dependent measure investigated was total errors (ie, the number of trials with latencies of 100 seconds). Figure 1 presents a summary of the relationships among the different treatment groups on this dependent measure. In the SP and C conditions depressed subjects made more errors than nondepressed subjects and the magnitude of this difference was the same after 24 hours. Subjects in the Immediate-IP condition had more total errors than either the SP or C subjects with very little differences between depressed and nondepressed subjects. This performance deficit disappeared by 24 hours with the nondepressed subjects exhibiting lower errors than depressed subjects in the 24 hour condition. See Table 3, Appendix H, for the means and standard deviations of all treatment groups on this dependent measure.

A 2x2x3 analysis of variance shown in Appendix H, Table 2, was performed with total errors as the dependent measure. The analysis compared depressed versus non-depressed, the time factor (Immediate versus 24 hour), and treatment condition (IP,SP,C). An examination of Table 1 revealed that the depressed versus nondepressed factor was significant ($p<.05$, $F(1,84) = 5.430$). This indicated that overall, the depressed groups made

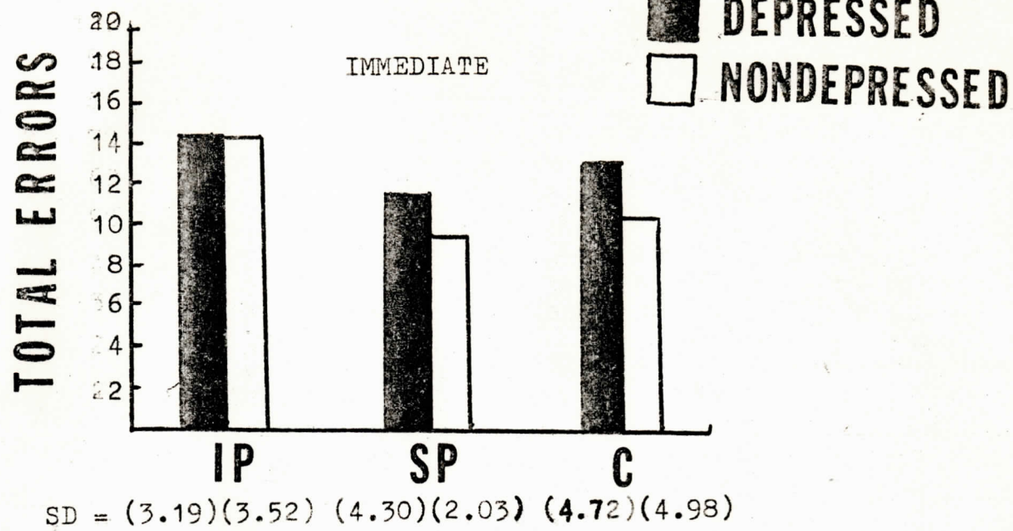


Figure 1: Means and Standard Deviations for 12 Groups for Total Error

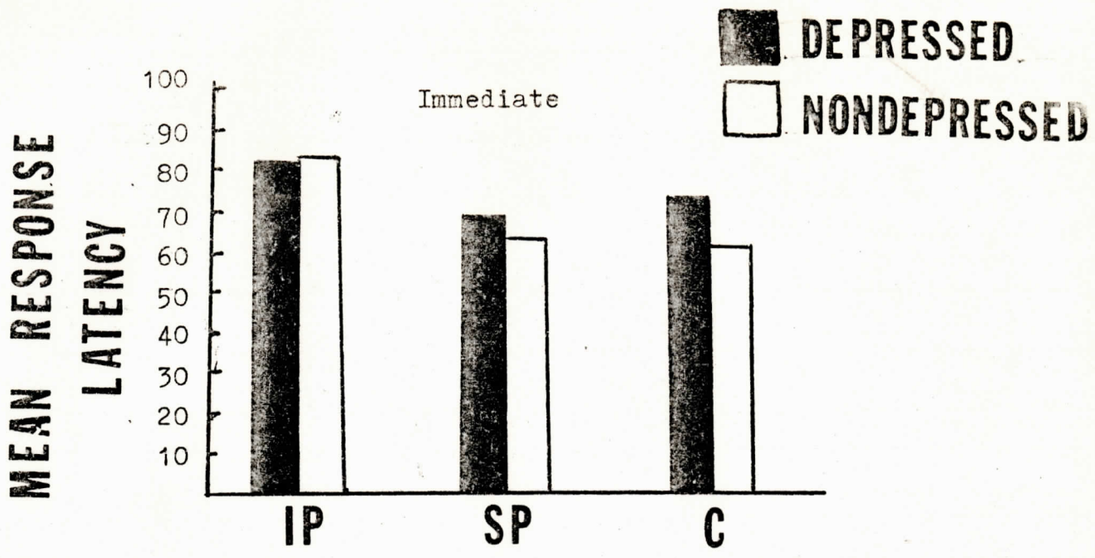
significantly more total errors than the nondepressed groups. The average number of errors for the depressed groups were 12.438 and 10.604 for the nondepressed groups. The main effects of time and treatment were not significant. The two-way interaction between time and treatment was also significant ($p<.05$, $F(2,84) = 3.4441$). See Appendix H, Table 4, for the means and standard deviations of this interaction. A comparison of means by use of a t-Test (Bruning and Kintz, 1968) indicated that the Immediate-IP group had significantly more total errors than the Immediate-SP, Immediate-C, and 24 hour-SP and 24 hour-IP groups. ($p<.05$, Critical differenc = 2.724, df =84). This suggested that exposing subjects to insoluble discrimination learning problems led to a significant deficit in performance on this dependent measure but that this effect disappears by 24 hours. The difference between the Immediate-IP and 24 hour-C groups were not significant. There was also no significant differences between any of the SP and C groups, suggesting that soluble discrimination learning problems do not significantly reduce total errors.

The first prediction made was that nondepressed subjects in the Immediate-IP condition would perform significantly more poorly on the test task than non-

depressed subjects in the Immediate-SP or Immediate-C conditions. Using the dependent measure of total errors, this prediction was confirmed. A t-Test was utilized which was significant at the $p<.05$ level (Critical difference = 3.854, df = 84). For the nondepressed subjects in the Immediate-IP, SP, and C groups, the means were 14.12, 9.87, and 10.00, respectively. In contrast, depressed subjects in the Immediate-IP group did not differ significantly from depressed subjects in the Immediate-SP or C groups on this dependent measure. The means for the Immediate-IP, SP, and C groups were 14.45, 11.62, and 13.00, respectively.

The second prediction was that depressed subjects in the Immediate-C conditions will perform significantly more poorly on the test task than the nondepressed-Immediate-C subjects, thereby mimicking the effects of uncontrollability. Although the results were in the predicted direction, they were not significant for total errors ($p<.50$, Critical difference = 3.85, df = 84). The mean of the depressed-Immediate-C group was 13.00 and the mean of the nondepressed-Immediate-C group was 10.00.

Mean Response Latency. The second dependent measure investigated was mean response latency. Figure 2 presents a summary of the relationships among the treatment groups on this dependent measure. In the SP and C conditions,



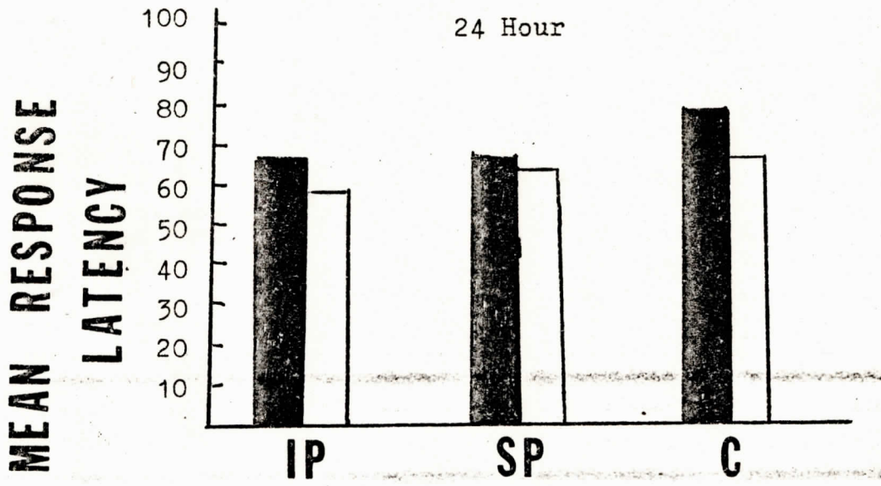


Figure 2: Means and Standard Deviations for All Groups for Mean Response Latency

depressed subjects had higher response latencies than nondepressed subjects and the magnitude of this difference was still evident 24 hours later. The Immediate-IP condition had higher response latencies than SP or C conditions with little differences between depressed and nondepressed subjects. Parallel to total errors, this performance deficit disappeared by 24 hours with nondepressed subjects showing lower response latencies than depressed subjects in the 24 hour condition. See Table 7, Appendix H, for the means and standard deviations of all treatment groups on this dependent measure.

Using the same factors as in the first analysis, an analysis of variance was performed using mean response latency (See Appendix H, Table 5). Table 5 reveals only one significant effect--that between time and treatment ($p<.05$, $F(2,84) = 3.208$). Comparison of means utilizing the t-Test suggests similiar results to those found with the time and treatment interaction with total errors. See Table 6, Appendix H, for the means and standard deviations of this interaction. Here the Immediate-IP group had significantly higher response latencies than the Immediate-SP, Immediate-C, 24 hour-IP, and 24 hour-C groups ($p<.05$, Critical difference = 13.12, df = 84). This suggested that exposure to insoluble discrimination learning problems led to a decrement in

response latency but that this deficit disappeared by 24 hours. Unlike on the total error dependent measure, depression-nondepression was not a significant factor on the mean response latency measure. This suggested that depressed subjects tend to make significantly more errors than nondepressed subjects, but their average time to respond to each anagram was not significant. There was no significant differences between Immediate-IP and 24 hour-C groups or between any of the SP or C groups.

For the nondepressed subjects, a significant difference was found between the Immediate-IP and Immediate-SP or C conditions using mean response latency as the dependent measure ($p<.05$, Critical difference = 18.5, df = 84). The means were 81.11, 61.73, and 61.58, respectively. For the depressed subjects, a significant difference was not found between the Immediate-IP and Immediate-SP or C conditions using mean response latency as the dependent measure. The means for these three groups were 80.85, 67.55, 72.81, respectively.

As with the first dependent measure, the prediction that depressed subjects in the Immediate-C conditions would perform significantly poorer than the nondepressed Immediate-C subjects was not significant ($p<.50$, Critical difference = 18.5, df = 84). The mean for the depressed Immediate-C group was 72.81 and the mean for the nondepressed Immediate-C group was 61.58.

As one might expect, more depressed subjects failed to appear for appointments than nondepressed subjects. Seven depressed and two nondepressed subjects failed to appear. On return visits it was quite different. One depressed and four nondepressed subjects failed to return for their second appointment. Three of the four nondepressed subjects had been exposed to the insoluble problems and one to the control group. The depressed subject had also been exposed to the insoluble problems. All subjects who failed to appear were replaced.

Discussion

In examining the results for the predictions made, one appeared to support the learned helplessness model of depression and the other does not. First of all, learned helplessness was produced in this experiment by the use of four insoluble discrimination learning problems. This replicated the work of Hiroto and Seligman (1975). Nondepressed subjects who were given four insoluble discrimination learning problems followed immediately by soluble anagrams made significantly more errors and had significantly higher response latencies than nondepressed subjects who were exposed to identical but soluble problems or who were asked simply to study

the problems. This effect was not significant in depressed subjects, suggesting that insolubility and depression were not additive. These results replicate the findings by Miller and Seligman (1975).

Secondly, Miller and Seligman (1975) stated that if learned helplessness is a valid model of depression, then depressed and nondepressed subjects in the Immediate-C conditions should differ from each other in the same way and on the same task that differentiate nondepressed subjects in the Immediate-IP condition and Immediate-C condition. Although the present experiment found results in this direction, they were not significant on either dependent measure.

In their study, Miller and Seligman (1975) found that depressed subjects exposed to escapable noise performed significantly better on all anagram dependent measures than the corresponding control group. The present study did not replicate this finding using discrimination learning problems. One reason for Miller and Seligmans' finding may have been the result of an experimentally biased sample in the escapable group. They stated that five depressed subjects in the escapable group were excluded from the final sample because they failed to learn to escape the noise. Thus the escapable noise subjects were chosen on the basis of their escape learning ability and thus less bright subjects were excluded from the sample. The present study did not employ this bias in that all subjects, regardless of their performance on the discrimination learning problem, were tested on the anagram task.

Perhaps one of the most important findings in this study was that learned helplessness, when produced by insoluble discrimination learnin problems, appeared to be a transient and temporary state, disappearing wi within 24 hours. If 24 hours elapses between insolubility and test tasks, learned helplessness did not appear on the test task. This was in contrast to the suggestion by Miller and Seligman (1975) that "the process induced by uncontrollability may be a rudiment of a 'trait'" (p. 327).

Another interesting finding was that depressed subjects tended to make more errors on the anagrams, but their response latency did not differ from the nondepressed subjects. This insignificant finding of response latency was in contrast to the general notion that depressed individuals tend to be slower than nondepressed individuals.

For further study it would be interesting to investigate the lasting effects of multiple sessions of insoluble discrimination learning problems rather

than one session as in the present study. It may prove, as in animals, that multiple sessions lead to longer lasting learned helplessness. Further, future studies may investigate the lasting effects of a more aversive helplessness inducing procedure.

References

Anderson, D. C. & Paden, P. Passive avoidance response learning as a function of prior tumbling trauma. Psychonomic Science, 1966, 4, 129-130.

Beck, A. T. Depression. New York: Hoeber, 1967.

Bibring, E. The mechanism of depression. In Greenacre, P. (Ed.), Affective disorders. New York: International Universities Press, 1953.

Braud, W., Wepman, B., & Russo, D. Task and species generality of the "helplessness" phenomena. Psychonomic Science, 1969, 16, 154-155.

Brookshire, K. H., Littman, R. A., & Stewart, C. N. Residue of shock trauma in the white rat: A three factor theory. Psychonomic Monographs, 1961, 75, (10, whole number 514).

Bruning, J. L. & Kintz, B. L. Computational handbook of statistics. Glenview, Illinois: Scott, Foreman, and Company, 1968.

Carlson, N. J. & Black, A. H. Traumatic avoidance learning: The effects of preventing escape responses. Canadian Journal of Psychology, 1957, 14, 21-28.

Dinsmoor, J. Pulse duration and food deprivation in escape from shock training. Psychological Reports, 1958, 4, 531-534.

Dinsmoor, J. & Cambell, S.L. Escape from shock training following exposure to inescapable shock. Psychological Reports, 1956, 2, 34-49.

Ferster, C. B. A functional analysis of depression. American Psychologist, 1963, 857-870.

Friedman, A. S. Minimal effects of severe depression on cognitive functioning. Journal of Abnormal Psychology, 1964, 69, 237-243.

Hiroto, D.S. Locus of control and learned helplessness. Journal of Experimental Psychology, 1974, 102, 187-193.

Hiroto, D. S. & Seligman, M. E. P. Generality of learned helplessness in man. Journal of Personality and Social Psychology, 1975, 31, (2), 311-327.

James, W. H. Internal versus external control of reinforcement as a basic variable in learning theory. Unpublished doctoral dissertation, Ohio State University, 1957.

James, W. H., & Rotter, J. B. Partial and one hundred percent reinforcement under chance and skill conditions. Journal of Experimental Psychology, 1958, 55, 397-403.

Kurlander, H., Miller, W., & Seligman, M. E. P. Learned helplessness, depression, and prisoners dilemma. Manuscript submitted for publication, 1974. Cited in Seligman, 1975 (b), chapter 3.

Leaf, R. C. Avoidance response evocation as a function of prior discriminative fear conditioning under curare. Journal of Comparative and Physiological Psychology, 1964, 58, 446-449.

Levine, M. Hypothesis behavior by humans during discrimination learning. Journal of Experimental Psychology, 1966, 71, 331-338.

Levine, M. Hypothesis theory and nonlearning despite ideal S-R reinforcement contingencies. Psychological Review, 1971, 78, 130-140.

Lichenberg, P. A. A definition and analysis of depression. Archives of Neurology and Psychiatry, 1957, 77, 516-527.

Lindner, M. Heredity and enviromental influences upon resistance to stress. Unpublished doctoral dissertation, University of Pennsyvania, 1968.

Maier, S. F. Failure to escape traumatic shock: Incompatible skeletal motor responses or learned helplessness? Learning and Motivation, 1970, 1, 157-170.

Maier, S. F., Anderson, C., & Leiberman, D. A. Influence of control of shock on subsequent shock-elicited aggression. Journal of Comparative and Physiological Psychology, 1972, 81, 94-100.

Maier, S. F. & Gleitman, H. Proactive interference in rats. Psychonomic Science, 1967, 7, 25-26.

Maier, S. F., Seligman, M. E. P., & Soloman, R. L. Pavlovian fear conditioning and learned helplessness. In Cambell, B. A., & Church, R. M., Punishment and aversive behavior. New York: Appleton-Century-Crofts, 1969.

Masserman, J. H. Behavior and neurosis. Chicago: University of Chicago Press, 1943.

McCulloch, T. L., & Pruner, J. S. The effect of electric shock upon subsequent learning in the rat. Journal of Psychology, 1939, 7, 333-336.

Melges, F. T., & Bowlby, J. Types of hopelessness in psychopathological process. Archives of General Psychiatry, 1969, 20, 690-699.

Miller, W. R. Psychological deficit in depression. Psychological Bulletin, 1975, 238-260.

Miller, W. R., & Seligman, M. E. P. Depression and the perception of reinforcement. Journal of Abnormal Psychology, 1973, 82, 62-73.

Miller, W. R., & Seligman, M. E. P. Depression, learned helplessness, and the perception of reinforcement. Manuscript submitted for publication, 1974. Cited in Seligman, 1975 (b), chapter 3.

Miller, W. R., & Seligman, M. E. P. Depression and learned helplessness in man. Journal of Abnormal Psychology, 1975, , 228-238.

Mowrer, O. H. An experimental analysis of "regression" with incidental observations on "reactive formation." Journal of Abnormal Psychology, 1940, 35, 56-87.

Mowrer, O. H., & Viek, P. An experimental analogue of fear from a sense of helplessness. Journal of Abnormal Psychology, 1948, 43, 193-200.

Overmier, J. B. Interference with avoidance behavior: Failure to avoid traumatic shock. Journal of Experimental Psychology, 1968, 78, 340-343.

Overmier, J. B., & Seligman, M. E. P. Effects of inescapable shock upon subsequent escape and avoidance learning. Journal of Comparative and Physiological Psychology, 1967, 63, 23-33.

Padilla, A. M., Padilla, C., Ketterer, T., & Giacalone, D. Inescapable shocks and subsequent avoidance conditioning in goldfish, Carrasius auratus. Psychonomic Science, 1970, 20, 295-296.

Paskind, H. A. Brief attacks of manic-depressive depression. Archives of Neurology and Psychiatry, 1929, 22, 123-124.

Payne, R., Anderson, D. C., & Murcurio, J. Preshock produced alternations in pain elicited fighting. Journal of Comparative and Physiological Psychology, 1970, 71,(2), 258-266.

Phares, E. J. Expectancy change in chance and skill situations. Journal of Abnormal and Social Psychology, 1957, 54, 339-342.

Powell, P. A., & Creer, T.L. Interaction of developmental and enviromental variables in shock elicited aggression. Journal of Comparative and Physiological Psychology, 1969, 69, 219-225.

Rotter, J. B., Liverant, S., & Crowne, D. P. The growth and extinction of expectancies in chance controlled and skilled tasks. Journal of Psychology, 1961, 52, 161-177.

Schildkraut, J. J. The catecholamine hypothesis of affective disorders. American Journal of Psychiatry, 1965, 112, 509-522.

Seligman, M. E. P. Fall into helplessness. Psychology Today, 1973, June, 43-48.

Seligman, M. E. P. Depression and learned helplessness. In R. J. Friedman and M. M. Katz (Eds.), The psychology of depression: Comtemporary theory and research. Washington, D.C.: Winston-Wiley, 1975. (a)

Seligman, M. E. P. Helplessness. San francisco: W. H. Freeman, 1975. (b)

Seligman, M. E. P., & Beagley, G. Learned helplessness in the rat. Journal of Comparative and Physiological Psychology, 1975, 88, (2), 534-541.

Seligman, M. E. P., & Groves, D. P. Nontransient learned helplessness. Psychonomic Science, 1970, 19, 191-192.

Seligman, M. E. P., & Maier, S. F. Failure to escape traumatic shock. Journal of Experimental Psychology, 1967, 74, 1-9.

Seligman, M. E. P., Maier, S. F., & Geer, J. H. Alleviation of learned helplessness in the dog. Journal of Abnormal Psychology, 1968, 73, (3), 256-262.

Seligman, M. E. P., Rosellini, R. A., & Kozak, M.J. Time course, immunization, and reversibility. Journal of Comparative and Physiological Psychology, 1975, 88, (2), 542-547.

Seward, J., & Humphreys, G. L. Avoidance training as a function of pre-training in the cat. Journal of Comparative and Physiological Psychology, 1967, 63, 338-341.

Suomi, S. J., & Harlow, H. F. Depressive behavior in young monkeys subjected to vertical chamber confinement. Journal of Comparative and Physiological Psychology, 1972, 80, 11-18.

Thornton, J. W., & Jacobs, P. D. Learned helplessness in human subjects. Journal of Experimental Psychology, 1971, 87, 369-372.

Tresselt, M. E., & Mayzner, M.S. Normative solution times for a sample of 134 solution words and 378 associated anagrams. Psychonomic Monograph Supplements, 1966, 1, 293-298.

Underwood, B. J. Retroactive and proactive inhibition after five and fourty-eight hours. Journal of Experimental Psychology, 1948, 38, 29-38.

Weiss, J. M. Effects of coping response on stress. Journal of Comparative and Physiological Psychology, 1968, 65, 251-260.

Weiss, J. M., Stone, L.A., & Harrell, N. Coping behavior and brain norpinephrine in rats. Journal of Comparative and Physiological Psychology, 1970, 72, 153-160.

APPENDIX A

SELF REPORT INVENTORY

A. a. I don't feel sad
b. I feel sad or blue
c. I am blue or sad all the time and I can't snap out of it
d. I am so sad or unhappy that it is quite painful
e. I am so sad or unhappy that I can't stand it

B. a. I am not particularly pessimistic or discouraged about the future
b. I feel discouraged about the future
c. I feel I have nothing to look forward to
d. I feel that I won't ever get over my troubles
e. I feel that the future is hopeless and that things cannot improve

C. a. I do not feel like a failure
b. I feel I have failed more than the average person
c. I feel I have accomplished very little that is wothwhile or that means anything
d. As I look back on my life all I can see is a lot of failures
e. I feel I am a complete failure as a person

D. a. I don't feel particularly guilty
b. I feel bad or unworthy a good part of the time
c. I feel quite guilty
d. I feel bad or unworthy practically all the time now
e. I feel as though I am very bad or worthless

E. a. I don't feel I am being punished
b. I have a feeling that something bad may happen to me
c. I feel I am being punished or will be punished
d. I feel I deserve to be punished
e. I want to be punished.

F. a. I am not particularly dissatisfied
b. I feel bored most of the time
c. I don't enjoy things the way I used to
d. I don't get satisfaction out of anything any more
e. I am dissatisfied with everything

G. a. I don't feel disappointed in myself
b. I am disappointed in myself
c. I don't like myself
d. I am disguisted with myself
e. I hate myself

H. a. I don't feel I am any worse than anybody else
b. I am critical of myself for my own mistakes
c. I blame myself for my faults
d. I blame myself for everything bad that happens

I. a. I don't have any thoughts of harming myself
b. I have thoughts of harming myself but I would not carry them out
c. I feel I would be better off if I were dead
d. I feel my family would be better off if I were dead
e. I have definite plans about committing suicide
f. I would kill myself if I could

J. a. I don't cry any more than usual
b. I cry more now than I used to
c. I cry all the time now. I can't stop it
d. I used to be able to cry but now I can't cry at all even though I want to

K. a. I am no more irritated now than I ever am
b. I get annoyed or irritated more easily than I used to
c. I feel irritated all the time
d. I don't get irritated at all for the things that used to irritate me.

L. a. I have not lost interest in other people
b. I am less interested in other people now than I used to be
c. I have lost most of my interest in other people and have little feeling for them
d. I have lost all my interest in other people and don't care about them at all

M. a. I make decisions about as well as ever
b. I try to put off making decisions
c. I have great difficulty in making decisions
d. I can't make any decisions at all any more

N. a. I don't feel I look any worse than I used to
b. I am worried that I am looking old or unattractive
c. I feel that there are permanent changes in my appearance and they make me look unattractive
d. I feel that I am ugly or repulsive looking

O. a. I can work about as well as before
b. It takes extra effort to get started at doing something
c. I don't work as well as I used to
d. I have to push myself very hard to do anything
e. I can't do any work at all

P.

P. a. I can sleep as well as usual
b. I wake up more tired in the morning than I used to
c. I wake up 1-2 hours earlier than usual and find it to get back to sleep
d. I wake up early every day and can't get more than 5 hours sleep

Q. a. I don't get any more tired than usual
b. I get tired more easily than I used to
c. I get tired from doing anything
d. I get too tired to do anything

R. a. My appetite is no worse than usual
b. My appetite is not as good as it used to be
c. My appetite is much worse now
d. I have no appetite at all any more

S. a. I haven't lost much weight, if any, lately
b. I have lost more than 5 pounds
c. I have lost more than 10 pounds
d. I have lost more than 15 pounds

T. a. I am no more concerned about my health than usual
b. I am concerned about aches and pains or upset stomach or constipation
c. I am so concerned with how I feel or what I feel that it's hard to think of much else
d. I am completely absorbed in what I feel

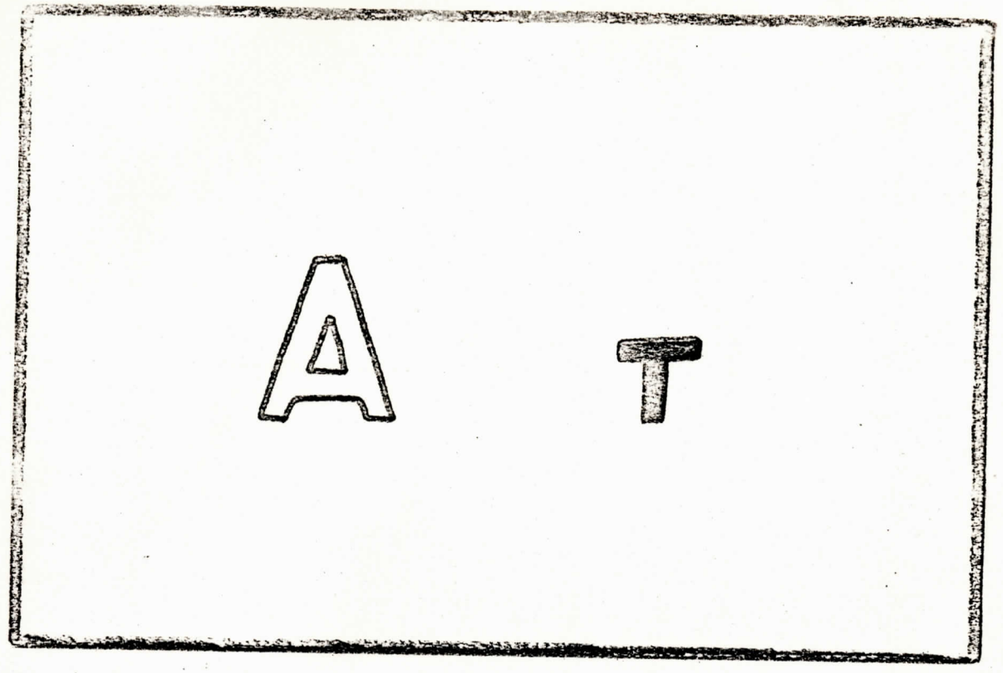
U. a. I have not noticed any recent change in my interest in sex
b. I am less interested in sex than I used to be
c. I am much less interested in sex now
d. I have lost interest in sex completely

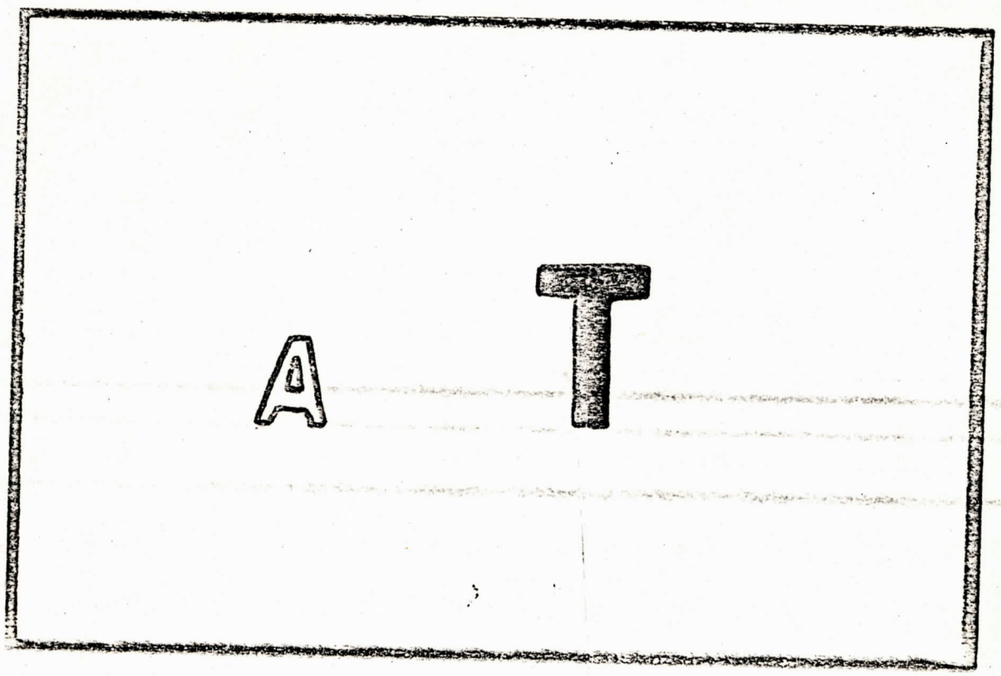
APPENDIX B

BDI INSTRUCTIONS

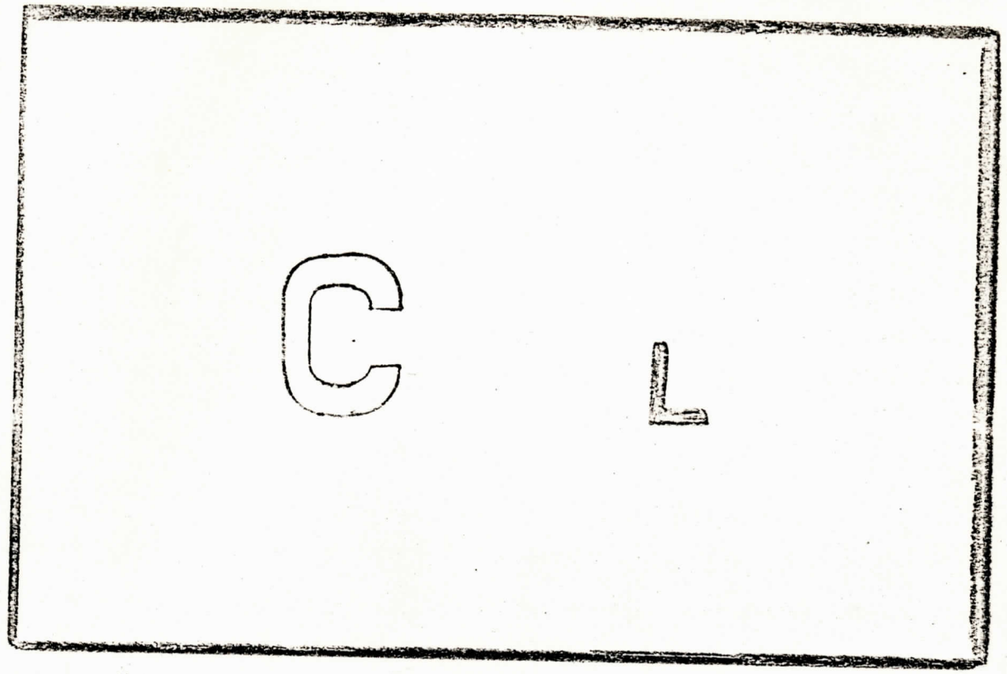
The BDI was given face down. When all BDI's were given out, subjects were asked to turn them over and read the following instructions: "This is a questionairre of 21 questions. Read each group of statements. Then I want you to circle the letter of the one statement in that group which best describes the way you feel today, that is, right now. If there are two or more statements describing the way you feel, circle the alphabetically higher one. For example, if statements 'b' and 'c' equally describe the way you feel right now, then circle the 'c' since it is the alphabetically higher one. Please be honest with yourself in answering all questions. All answers and scores are strictly confidential. Any questions?...Start."

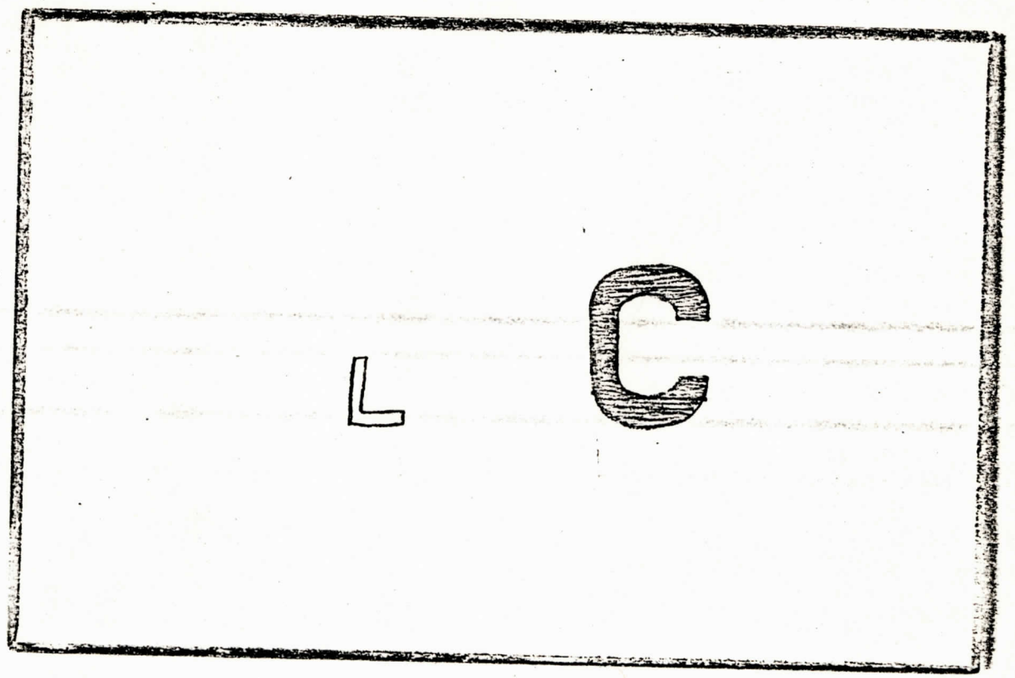
APPENDIX C
Sample Discrimination Learning Cards





Pretreatment Discrimination Learning Cards





APPENDIX D

Test Task: Anagrams

First Set

	Anagram	Solution Word	Anagram	Solution Word
1)	puomi	opium	unodp	pound
2)	clsea	scale	airnt	train
3)	eryna	yearn	idueg	guide
4)	aioss	oasis	erlkc	clerk
5)	lrfti	flirt	iardt	triad
6)	aellp	lapel	siucm	music
7)	uiatd	audit	rucbs	scrub
8)	dpato	adopt	bloen	noble
9)	nluec	uncle	opdta	adopt
10)	glaei	agile	tailv	vital
11)	asceu	cause	tearw	water
12)	hicra	chair	ulatf	fault
13)	orcab	cobra	clneu	uncle
14)	aohcv	havoc	utohy	youth
15)	poanr	apron	biath	habit
16)	lcete	elect	deirc	cider
17)	rmcpa	cramp	rtihb	birth
18)	cnigi	icing	coanb	bacon
19)	lufro	flour	imlbc	climb
20)	noewd	endow	iupmo	opium

APPENDIX E

Instructions to all subjects: "Your first task will be a sample discrimination learning problem followed by four new problems. (The subject was handed the first sample discrimination learning card). In this experiment you will be presented with a series of cards like this one, each card having two different stimulus patterns. These patterns are made of three different dimensions with two characteristics associated with each dimension. (The experimenter described and showed the subject the dimensions and characteristics). Each stimulus pattern has one characteristic of each of the three dimensions with the other pattern having its complimentary characteristic."

The Control subjects instructions stopped here with the added instruction, "Look at each stimulus pattern carefully and go to the next card when I tell you."

The rest of the instructions for the insoluble and soluble groups were as followed: "I will randomly choose one of these six characteristics as being 'correct'. For each card your task will be to point to the stimulus pattern which you think contains this characteristic and I will tell you whether you are correct or incorrect. Then you will go to the next

card, make your decision, and I will tell you again whether you are correct or incorrect. We will do this for all the cards. By the correct or incorrect feedback which I give you, you can learn which one of the six characteristics I have chosen. You are to figure this out as quickly as possible so you can choose correctly as often as possible. When all cards have been presented I will ask for your final answer. Remember that you have three dimensions with two characteristics associated with each dimension. Any questions?"

APPENDIX F

Instructions for Pretreatment Problems

Instructions to Control Subjects: "Now you will be presented with some new cards. Please continue to study each stimulus pattern and go to the next card when I tell you to."

Instructions to the Insoluble and Soluble Subjects: "Now you will be presented with some new cards which compose a new problem. These new cards are similiar to the sample cards you have just seen except there is an added dimension and thus two new characteristics. The added dimension is the position of the stimulus pattern and the added characteristics are the right and left positions. So on these new problems you have four dimensions and eight characteristics. (The experimenter described and showed the subject the dimensions and characteristics). I will randomly choose one of these eight characterisitics as being "correct". Your task will be the same as before and after your response to each card, I will give you correct or incorrect feedback. Any questions?"

APPENDIX G

Anagram Instructions

"In this task you will be asked to look at some cards. On each card there is a word written but the letters have been mixed up. Your task is to unscramble the letters so that they form a word. When you have found the word, tell me."

APPENDIX H

TABLE 2

Analysis of Variance for Total Errors

Source	Df	Mean Square	F
Depression (D) vs Nondepression (ND)	1	80.667	5.430**
Time	1	37.500	2.524
Treatment	2	20.041	1.349
D-ND x Time	1	1.042	0.070
D-ND x Treatment	2	5.167	0.348
Time x Treatment	2	51.167	3.441**
D-ND x Time x Treatment	2	5.042	0.339
Residual Error	84	14.857	
Total	95	16.105	

** $p < .05$

TABLE 3

Means and Standard Deviations for Total Errors

Group	Depressed		Nondepressed	
	Mean	SD	Mean	SD
Immediate	12.958	4.091	11.333	4.082
Insoluble	14.450	3.196	14.125	3.523
Soluble	11.625	4.306	9.875	2.031
Control	13.000	4.721	10.000	4.986
24 Hour	11.917	3.550	9.875	3.916
Insoluble	11.250	3.732	8.875	5.167
Soluble	11.125	4.086	9.875	4.224
Control	13.375	2.669	10.875	1.885
	12.438	3.825	10.604	4.025

TABLE 4

Means and Standard Deviations for the Time x Treatment Interaction for Total Error

Group		
Immediate	Mean	SD
Insoluble	14.288	3.250
Soluble	10.750	3.376
Control	11.500	4.940
24 Hour		
Insoluble	10.063	4.524
Soluble	10.500	4.066
Control	12.125	2.579

TABLE 5

Analysis of Variance for Mean Response Latency

Source	Df	Mean Square	F
Depression (D) vs Nondepression (ND)	1	99215.062	2.881
Time	1	38314.109	1.112
Treatment	2	45509.375	1.321
D-ND x Time	1	1666.471	0.048
D-ND x Treatment	2	14566.336	0.423
Time x Treatment	2	110482.430	3.208**
D-ND x Time x Treatment	2	6285.137	0.182
Residual Error	84	34441.402	
Total	95	35641.691	

**p<.05

TABLE 6

Means and Standard Deviations for the Time x Treatment Interaction for Mean Response Latency

Group		Mean	SD
Immediate			
	Insoluble	80.98	9.85
	Soluble	64.64	18.00
	Control	67.19	23.54
24 Hour			
	Immediate	63.68	23.23
	Soluble	65.47	19.21
	Control	73.67	11.80

TABLE 7

Means and Standard Deviations for Mean Response Latency

Group	Depressed		Nondepressed	
	Mean	SD	Mean	SD
Immediate	73.73	18.39	68.14	19.43
Insoluble	80.85	10.91	81.11	9.42
Soluble	67.55	22.18	61.73	13.76
Control	72.81	19.97	61.58	26.51
24 Hour	71.24	17.76	63.98	19.49
Insoluble	67.62	20.85	59.75	26.18
Soluble	67.19	18.83	63.75	20.72
Control	78.91	12.08	68.44	9.48
	72.48	17.96	66.06	19.40